

**REMARKS**

Claims 1-6, 19, 20, 22, 23 and 25-27 are pending. Claim 1 is amended, claims 25-27 are added and claims 13-18, 21 and 24 are cancelled.

No new matter has been added by way of the present amendments. For instance, the amendments made to claim 1 are supported by claim 13, now cancelled, as well as the present specification at page 5, line 37 to page 6, line 1, page 6, lines 23-25 and page 7, lines 7-8. Newly added claim 25 is supported by the present specification at page 6, line 1. Lastly, newly added claims 26 and 27 are supported by the present specification at page 6, lines 10-12. Accordingly, no new matter has been added.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

**Issues under 35 U.S.C. §102(e)**

The Examiner has rejected claim 1 under 35 U.S.C. §102(e) as being anticipated by Yoo, U.S. Patent No. 6,376,806 B2 (hereinafter referred to as Yoo '806). Applicants respectfully traverse this rejection.

Independent claim 1 of the present invention relates to a method for manufacturing a photomask blank having a film of at least one layer formed on a substrate, comprising the steps of forming a film on a synthetic quartz glass substrate, and irradiating the entire surface of the film all at once with light from a flash lamp, wherein the film is a phase shift film, a light-shielding film or an antireflection film, and an intensity of the irradiation is in a range of 1 to 50 J/cm<sup>2</sup> and a duration of the irradiation is up to 1 second.

In contrast, Yoo '806 discloses a system for rapid thermal processing of a substrate. The system of Yoo '806 comprises:

a radiation energy source; and

a reflector substantially surrounding said radiation energy source causing radiation energy to impinge on a surface of a substrate, said radiation energy source configured to be flashed to suddenly heat an active layer of said substrate, said radiation energy including an average power of between about  $0.5 \text{ J/cm}^2$  and about  $100 \text{ J/cm}^2$  (see claim 1 of Yoo '806).

According to Yoo '806, the "active layer" is described as follows:

Referring now to FIGS. 2A and 2D, **active layer or device layer 224 is a portion of wafer 108, which extends from surface 223 of wafer 108 down to a depth a below surface 223.** The depth  $\alpha$  is typically between about  $0.05 \text{ }\mu\text{m}$  and  $1 \text{ mm}$ , but will vary with the process and device feature size. Active layer 224 is well known in the semiconductor manufacturing industry as that portion of the wafer in which semiconductor devices are formed, such as **transistors, diodes, resistors, and capacitors** (see column 6, lines 51-59 of Yoo '806) (emphasis added).

In contrast to Yoo '806, the method of claim 1 utilizes a photomask blank which includes a synthetic quartz glass substrate, and a film of at least one layer which is formed on the substrate. Yoo '806 fails to disclose a photomask blank including a synthetic quartz glass substrate and a film such as a phase shift film, a light-shielding film or an antireflection film. Accordingly, there is no anticipation based upon Yoo '806. The Examiner is therefore respectfully requested to withdraw this rejection.

Issues under 35 U.S.C. §103(a)

The Examiner has rejected claims 1-6 and 13-24 under 35 U.S.C. § 103(a) as being obvious over Nozawa, U.S. Patent No. 6,746,806 B2 (hereinafter referred to Nozawa '806) in

view of Nozawa et al., U.S. Patent No. 6,677,087 (hereinafter referred to as Nozawa '087), Yoo '806 or Ito et al., U.S. Patent No. 6,770,519 B2 (hereinafter referred to as Ito '519). Applicants respectfully traverse this rejection.

Applicants respectfully submit that the cited art, even when taken in combination as suggested by the Examiner, cannot form the basis for a *prima facie* case of obviousness. For instance, as discussed above, in the present method, the entire surface of the film is irradiated all at once with light from a flash lamp. In contrast, the method of Nozawa '806 is described as follows:

The method according to this invention can remarkably shorten the heating and the cooling times and improve the productivity by the above-mentioned effect and is more advantageous **in comparison with the conventional method of heating a whole of the transparent substrate with the film** by using the oven or the hot plate." (see column 3 lines 60-65 of Nozawa '806) (emphasis added).

Thus, it is apparent that Nozawa '806 does not heat the whole of the substrate with the film.

Later, a review of Nozawa '806 strengthens this point. For instance, Comparative Example 3 of Nozawa '806 is as follows:

An excimer ultra violet (U.V.) ray irradiation apparatus as shown in FIG. 4 was used to optically process transparent substrates that have translucent films deposited in the above-mentioned manner. The optical processing was made in a nitrogen atmosphere for thirty minutes by irradiating an excimer laser beam having a wavelength of 172 nm. Optical intensity was about 10 mW/cm<sup>2</sup>. Flatness was measured about the transparent substrates before and after the optical processing. The resultant translucent films had flatness specified by a convex of 1.1  $\mu$ m before the optical processing and exhibited a strong compressive stress. After the optical processing, the translucent films had flatness of 1.1  $\mu$ m and were not improved in compressive stress. (see column 10, line 64 to column 11, line 10 of Nozawa '806).

Thus, in the above Comparative Example of Nozawa '806, an excimer ultra violet ray is irradiated to the entire surface of the translucent films. (See FIG. 4.) In this case, where U.V.

rays have a wavelength (173 nm) within a preferable range (157-633 nm) of the cited invention was used, the translucent films were not improved in compressive stress. Hence, in Nozawa '806, an apparatus as shown in FIG. 2 is used, and a line beam scans the workpiece with a low intensity of 50 to 500 mJ/cm<sup>2</sup> (0.05 to 0.5 J/cm<sup>2</sup>). It is thus evident that for Nozawa '806, it is ineffective that an entire surface of the film is irradiated at the same time. Nozawa '806 in fact only teaches line beam irradiation.

The deficiencies of the primary reference of Nozawa '806 discussed above cannot be overcome with the secondary references. For instance, Nozawa '087 simply discloses a phase shift film. Nozawa '087 provides no guidance concerning the use of energy irradiation from a flash lamp. Additionally, Yoo '806 simply teaches that an active layer, which is a part of a semiconductor wafer, is irradiated with energy from Xe arc lamp. Ito '519 teaches a semiconductor surface layer treated with light from a xenon flash lamp. However, both layers of Ito '519 are disposed on silicon (not on a synthetic quartz glass).

Therefore, it is evident that the present invention is unobvious from teachings of Nozawa '806, Nozawa '087, Yoo '806 and Ito '519. Nozawa '806 simply fails to suggest that the entire surface of the film is irradiated at the same time. According to the present invention, a film (a phase shift film, a light-shielding film or an antireflection film) formed on a synthetic quartz glass substrate is irradiated and the entire surface of the film is irradiated all at once (at the same time). The secondary references cited by the Examiner cannot cure the deficiency of the primary reference of Nozawa '806. Therefore, there exists no *prima facie* case of obviousness.

Additionally, even if the Examiner has hypothetically established a *prima facie* case of obviousness, a point not conceded by Applicants, the present invention achieves unexpectedly

superior results. That is, according to the present method it is possible to minimize warpage and improve chemical resistance. Such results are completely absent from the cited art and are therefore unexpectedly. Thus, any hypothetical *prima facie* case of obviousness is moot.

In summary, Applicants respectfully submit that the Examiner has failed to present a valid *prima facie* case of obviousness. Alternatively, a hypothetical *prima facie* case of obvious is moot in view of the unexpectedly superior results according to the present invention. Accordingly, the Examiner is respectfully requested to withdraw all rejections and allow the currently pending claims.

If the Examiner has any questions or comments, please contact Craig A. McRobbie, Registration No 42,874 at the offices of Birch, Stewart, Kolasch & Birch, LLP.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Dated: September 29, 2006

Respectfully submitted,

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By  #42874

Gerald M. Murphy, Jr.

Registration No.: 28,977

BIRCH, STEWART, KOLASCH & BIRCH, LLP

8110 Gatehouse Road

Suite 100 East

P.O. Box 747

Falls Church, Virginia 22040-0747

(703) 205-8000

Attorney for Applicant